



Swedish University of Agricultural Sciences

Faculty of Landscape Planning, Horticulture and Agricultural Sciences

Department of Landscape Architecture

LIGHTING OF PUBLIC SPACES IN MALMÖ

Belysning av offentliga platser i Malmö

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Bachelor degree project in Landscape Architecture, 15 hec

Landscape Architecture Programme, Basic level

Serie: Självständigt arbete vid LTJ-fakulteten, SLU

Alnarp 2011

Title in English: Lighting for public spaces in Malmö
Title in Swedish: Belysning av offentliga platser i Malmö

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Credits: 15 hec

Level: Basic

Course: Bachelor degree project in Landscape Architecture

Course code: EX0649

Programme: Landscape Architecture Programme

Serie: Självständigt arbete vid LTJ-fakulteten, SLU

Place of publication: Alnarp

Year of publication: 2011

Keywords: lighting, public space, urban lighting, landscape design, urban design,
aspect, experience



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ABSTRACT

Bachelor project in landscape architecture is named Lighting of public spaces in Malmö. Purposes of this project are to examine how lighting may create enchanting rooms in the outdoor public environment, to issue guidelines for outdoor lighting and perform public space in Malmö in a more visible and creative way through proposals which make public space inviting and attractive and thus render the sense of place which is lost in the dark.

First part of this project is an explanation of various aspects in lighting design and discussion about lighting now-a-days. I studied lighting designs and found inspiration in them. Through sketches, diagrams and photos I better understood the visual impact of exterior lighting. A literature study has been taken into consideration when describing different aspects and phenomenon of outdoor lighting.

The second part, starting with Context, introduces the project areas in Malmö which differ from usage, position and size. Analyses of each spot are followed by a presentation of the design process showing how theory and inspirations lead to new lighting solutions within the city of Malmö.

Three spots are presented together with descriptions and design proposals aiming to make the city more alive and inviting during the night.

The concluding part is discussion where all parts of this project are tied together as a whole; it is an insight into results led back to the theory.

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INTRODUCTION

Background

Electric lights has, since the beginning of the 20th century driven back the dark, and deliberately changed the sense of the night in cities. The daytime, suddenly was prolonged into an emerging nightlife. The illuminated night characterized new warmth into the cities with a special feeling.

Now-a-days it is normal to take street lights at night for granted, and accordingly we tend to forget the extent of the development with light that has taken place in the past 150 years.

A basic and principal matter of fact about exterior lighting is that people are drawn to the brightest source of illumination. Using this knowledge constructively and designing lighting precisely, helps to lead people exactly where you would like them to go.

The aim of contemporary lighting for outside spaces is to create a subtle, natural feel but on the other hand, to lit up important elements in urban environment in spectacular way. Latterly among the lighting designers it is more and more mentioned how plants, pathways, and sculpture are painted with light. Trees seem to glow in a silvery blue light; walkways and planting beds are illuminated with variegation of patterns coming from light and shadow.

It is important how you design the light in relation to how humans see. Landscape lighting and

security lighting serve two different functions; one should not be negated by the other.

What should one consider when putting together an exterior lighting design? The first step is to conceptualize what needs to be seen at night to create a positive impression on people and emphasize significance. Well-designed landscape lighting gives the viewer all the information they need about the proportions of the space; width and depth of the property, how the building interweaves on the site, the height of vegetation in relation to the neighbouring buildings etc.

The purpose of good lighting is to flatter, rather than overpower, the building itself and its surrounding area. Night time provides a chance to design a dazzling, audacious atmosphere, to highlight the shape of greenery, statuary art, and water features in order to create a series of exciting focal points and lively disposition. In fact, outdoor lighting can be far more dramatic than indoor lighting. When creating outdoor rooms, lighting can be split into three categories: accent lighting, task lighting, and ambient lighting. Layering these three types of lighting creates vivid, luminous outdoor spaces that invite people to linger.

Background

Purpose

Aim

Method & Process

INTRODUCTION

Purpose

The main purpose of this project is to examine how lighting may create enchanting rooms in the outdoor public environment. Within the designing part, I want to issue guidelines for outdoor lighting and thus, perform public space of Malmö in a more visible and creative way. To understand the sense of place in relation to lighting, review of existing lighting designs around the world gave me convenient starting points in the process. Through investigation of places in detail and designing steps, I want to come out with proposals which make public space inviting and attractive and thus render the sense of place which is lost in the dark. In this manner, this concept is an attempt to make the city more alive during the night.

Aim

First of all I had liked to explore the meaning of lighting from various aspects. Aim is to show how lighting may give a completely different view of the urban environment during the night. I studied already completed lighting designs and became inspired by them in a creative sense. Moreover, I studied existing lighting in the urban context with the intention of being inspired by them. At the very beginning put out a discussion about outdoor lighting now-a-days.

Afterwards, a theoretical part with historical background and a general view on lighting is described, including several important aspects which need to be taken into account; safety, human perception, functionality, economy, attraction and aesthetic. Further on I tried to find lighting which may have inspired me and reflect on some new ideas. My task was to find spots around Malmö which hold a potential to be lit up in more spectacular way. The greatest part is the design itself; I did proposals for 3 spots around Malmö and investigated them more in detail. The aim of this paper was to find a balance between functional and spectacular outdoor lighting and give to different spots of Malmö's urban environment a new outlook, painted with light.

Method & Process

First of all I have gathered appropriate literature which helped me to narrow down my thoughts and ideas about outdoor lighting. Further on, I searched after lighting designers around the world and tried to compare their work and see what they wanted to achieve with their designs. Starting points were written down to keep focusing merely on required theory and simultaneously think about design. After the introduction, the work process continued with writing theory, sketching, and making a real lighting design.

Background

Purpose

Aim

Method & Process

On-going discussion about lighting

Outdoor lighting provides safety, security, aesthetics, and economic development opportunities. There are many weighty reasons to light the outdoors. However, it is important to understand how much outdoor lighting is enough and how to balance the need for light while minimizing light pollution and increasing energy efficiency.

Roger Narboni in his book *Lighting the Landscape* refers to sustainable lighting design which is now-a-days a current issue all around the world. He explains that the invention of sustainable lighting is to come out with a number of new fundamental principles, starting with the lighting programme that will alter on find their application during the development of the lighting design project. He is sure that some fresh researches are taking into account values of night and darkness, controlling light pollution, economising on energy and establishing an energy result for each lighting project, etc., and the consideration of all aspects of development will allow for the creation of interesting lighting design projects that are responsive for the protection of the environment and the preservation of the social fabric and local life, within the conception of quality nocturnal landscapes.

Historical background

Roger Narboni (2004, p.12) in his book *Lighting the landscape* writes about the history of nocturnal landscapes. He writes: ‘since the dawn of history, humans have contemplated the night-time landscape presented to view, framed by the entry of a protective cave with a roaring fire glowing in the background. And then this fire go over to the candles of the Middle Ages, echoed in the evolution from oil to the first gas lighting, the invention of the electric lamp and the delirium of the World Exhibition, the exaggerated functionalism after the war, and most recently to the rediscovery of urban lighting around the end of the 1980’s, the appropriation of nocturnal space has always occupied humans.’

Narboni (2004, p.12), in his book also describes that the appearance of the pioneers in lighting design in the middle the 1980’s, accretion of elected officials and planners for urban lighting and thus phenomenon of urban lighting as a new field, contribute to the new spirit of cities during the night time. In the beginning of the 1990’s people were divided between those who prefer public nocturnal space as it is during the day and those who want to stimulate the accomplishment of spectacular lighting and the proliferation of statuary art illumination.

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At the beginning, lighting had just a status of simple equipment, but after time urban lighting has become a specialised field of design, and among people now is recognised as one of the most important and necessary constituent of all urban projects.

Natural nocturnal landscapes, including the moon, fire emanating from the sky, volcanoes in eruption and streams of lava pouring down the slopes and into the ocean, lakes of lava, unique aurora borealis and thousand of fireflies etc. are still unforgettable natural spectacles, ever magic and memorable.

Narboni (2004, p.13) in his book describes how during the late 19th and early 20th centuries the cult of the ‘electricity fairy’ surrounding the World and colonial exhibitions, resulted in a kind of luminous delirium, leading to the creation of numerous ephemeral nocturnal landscapes. He illustrates how festivals are also peculiar occasions for re-forming the urban landscape. He highlights the night of the 31th of December in Rio de Janeiro in Brazil as well as the French Revolution and the City of Lyons which is dressed in light every year about 8th of December. I found it interesting how also the public spaces of the Swedish city Alingsås, are for three weeks metamorphosed by ELDA (European Lighting Designers Association). The festival is called ‘Lights in Alingsås’.

Urban lighting

Play of shadow, contrast between bright and dark, lighting colors and balance of dark make the creation of nocturnal scenes alive and effectual. Natural light is needed for human and animal well being; plants also depend on light for photosynthesis. But on the other hand, artificial light brings newness in the urban environment and has a positive impact on the human disposition referring to quality of life, safety, psychological impression or even alleviation of the winter coldness.

Different aspects

Functional aspect

When creating a nocturnal regional landscape, different opinions appear. While some doubt about the necessity of new lighting development, others tend to see landscape in its original picture. On the other hand there are people who long for the calmness of the night. The public is often just satisfied with poor quality of city lighting.

The creation of nocturnal landscapes is not just the realisation of new landscapes with corresponding lighting, but it also includes renovation of existing lighting. Thus, it is also important to emphasize significant sections of some landscapes, especially those in direct visual connection to the cities.

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Referring to Narboni, it is important to recognize areas which tend to be more visible from a far distance since they are related to our living environment or because of the historical significance. Thus, new perspectives can be manifested.

Existing lighting is often not perceived as enchanting but it is rather dull and sad due to its functional task; lighting a section of a roadway, a village, a technical installation or maybe a tourist info center. Usually this lighting is realised without any design basis and does not fit to the place.

Vision versus practicality

The authors in book The Outdoor Lighting Guide (2005, p.57) put out an important aspect of lighting referring to vision and practicality. They stress how lighting strategies have become more practical in recent years.

Stress lay on planning exercise more than on vision; in such manner exterior lighting becomes more focused and directed, similar to other areas of urban planning, like paving. In opposition to ordinary outdoor lighting, lighting of public spaces may be convenient for public users and a variety of necessary aspects need to be taken into account. Cities now-a-days have a tendency to entertain their residents and visitors in every feasible manner. Outdoor lighting should not be an exception. Dramatic and theatrical lighting is more and more expected

but has to be controlled. Spectacular lighting may exist over and above the base lighting for traffic and pedestrian.

Spectacular lighting may give to public spaces new outward form and should arouse people's attention. Looking from a wider perspective, every city should have its own lighting master plan which covers required lighting in the city and its surrounding. Lighting designers need to collaborate with other professions concerning lighting itself. When designing public space, lighting may hold a significant part in the process. Thinking about users and how they experience the space, designer should provide safe and undisturbed use of space. This is achieved through the adoption of modern lighting techniques and technologies.

Pedestrian-friendly and pedestrian-oriented lighting is based on current research into 'visual interest' and 'visual comfort' in interior-lighting schemes and practical experience of the way that people use urban centres during the night.

The Institution of lighting Engineers subscribes with The Bartlett School of Architecture's research where crucial role of the 40° viewing zone as the primary zone of 'visual interest' for pedestrians. This is defined as a cone 20° above and below a horizontal line extended out of the eye. This viewing zone includes the principal vertical surfaces around them (walls, trees, monuments, and other people).

(The Institution of Lighting Engineers, 2005, page 147)

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At the same time, in my point of view horizontal surfaces may not be excluded but need to be applied carefully and not present the space in an inconvenient way. In such a manner, illuminated surrounding facades form the space, while lighting flat surfaces add to the mighty adventure of the place. The square itself tends for people to walk through it and linger in its brightest areas. Furthermore, footpaths and sidewalk lighting is usually purposeful for drivers and not for pedestrians. Due to safety and practical reasons less attention was given to this type of outdoor lighting. While considering that light on the way needs to be as low and direct as possible, there may be a way to perform footpaths in more attractive form but to bear in mind drivers safety and convenience. Light should be grazing directly above the ground which does not cause glare or obscure the view. Unavoidable significance of light is to provide orientation that is now increasingly achieved through the use of recessed elements which have become smaller, price accessible and more durable with LED technology concerning solar energy.

Just so, greenery is in contrast with surrounded built surfaces. A buried luminary is the method currently established for lighting trees. To lay stress on pedestrians, buried luminaries should not be positioned along lines of movement. When a tree is illuminated from a distance, it holds sculptural character

quality and casts a play of shadows. The most common way of lighting vegetation comes out in December or even before, when lights are placed on the branches lighting the tree from within. While thinking about colour, trees turn out pleasing if they are illuminated with neutral white halogen metal lamps. Illuminated trees composing the silhouette in open space seen from a distance present space in a mightily tempting way.

While some metropolises as Sao Paulo in Brazil forbid the illuminated advertising shining from buildings, in other cities illuminated ads are still subject to planning approval. The built image of the city is turning pale due to inefficient application of cinematic scale advertisement.

Lighting designer moves along a two dimensional design strand, concerning the dimension of time and space. It is about day-night intervals as well as seasonal changes which has increasingly enhanced the need of lights among the city and its environment.

Vegetation among a city in general aspires to soften sharp edges of a particular space.

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Festival lighting

As it is mentioned in The outdoor lighting guide book, effect lighting is a term used to describe the lighting of objects in the exterior landscape to introduce exciting or dramatic aspects or simply to draw attention to a particular feature.

Floodlighting has two roles; it is a technique that is widely used for effect lighting, which is different to floodlighting as a functional lighting referring to security lighting for open areas where observation is needed at night, as well as a deterrent to crime. Sport floodlighting and safety lighting also belong to functional floodlighting while floodlighting as effect lighting is different since it is carried out purely for aesthetics. The objective of this lighting in an effective sense is to create or make an impact with a particular atmosphere. Since the lighting should bring subjects to life after dark, rather than ‘flood-ing them with light’, ‘effect lighting’ is probably the closest to an accurate expression. In that sense the phrase is chosen to declare the intention, and to use as a guide to what the object of the lighting is.

(The Institution of Lighting Engineers, 2005, page 168)
More to say, effect lighting can also mean designing shadow areas into the scene. Thus shadows are a prominent part of the overall effect.

According to The outdoor lighting guide book, ‘paint-ing with light’ is a phrase that describes the way in which

effect lighting can be used. Relating to painters who think about light and dark, colour, form and strength of detail as well as many other aspects, lighting designers should follow their principles.

Festival lighting is aimed at making a location special to the occasion and in this way encouraging public attendance to an area or attraction. As the Institution of Lighting Engineers promotes in its book The outdoor lighting guide, the fundamental aim of any illuminated festival decoration is to promote a brighter and more playful sphere at night. To be tantamount to daytime, appearance of statuary art should be given equal importance also during the night.

(The Institution of Lighting Engineers, 2005, page 168)

Human perception of lighting

Roger Narboni (2004, p.41), in his book Lighting the Landscape writes about the human perception of lighting, starting with the eye and the vision which is a complex process that depends upon physical, physiological and psycho-physiological phenomena. Vision is defined as a sum of the information of luminous origin arriving at the brain. Vision consists of different characteristics, which are effective in relation to all the other senses. For humans, vision is the most significance sense.

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Since people are active not only during the day but also during the night, the human eye has a hybrid function. People differ from each other, this means that some of them are shortsighted (they see well up close but poorly at a distance, while others can only clearly see an object at a distance with great effort; they are called farsighted. Narboni concludes how vision deteriorates with age; in that manner we are all destined to become farsighted.

For residents light becomes obtrusive, where it enters rooms of dwelling which are normally dark. An indicator of this effect is the luminance, particularly on vertical surfaces. Furthermore, the direct view of bright luminaries from normal viewing directions causes annoyance, distraction or even discomfort. The luminance of lighting, in a oriented direction, is an indicator of this effect.

The acceptable luminance of signs depends on the size of the surface viewed. By positioning luminaries far from the observers field of view, usually higher, glare from luminaries can be disabled. Referring to ground-recessed luminaries, it cannot adequately provide the primary lighting to the ground owing to the limited distribution of light which will not be incident to that surface.

Since exterior lighting confronts with the lack of vertical surfaces in surrounding, design and consideration need to be deliberately carried out.

Due to users mobility around the area, complexity of lighting design may increase. Design requires high sameness of illumination and careful assessment of the glare from several directions.

Safety

The Institution of lighting Engineers stresses, in its book that luminaries generate heat and light, and this becomes an issue when the surface temperature of exposed areas exceeds levels of comfort and/or safety for human contact. Since temperatures of 150°C are not uncommon, luminaire should be beyond the direct access of the public to avoid a present problem. When setting up lighting on the spot, it is necessary to ensure that surface temperature of accessible luminaires is within a safe range. In that case, ground-installed luminaires should have low energy (fluorescent) light sources and should be built in heat filters as well as covered with a double-glazed visor. This may be achieved through 'dichroic' filters which allow the transmission of light, but in the meantime heat energy transmission is blocked, and is dispersed back through the fitting-body structure into the ground.

A surface temperature of 70°C is still relatively safe but need to be taken into consideration when it comes to water features in vicinity.

(The Institution of Lighting Engineers, 2005, page 186)

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Lighting equipment

As Ulrike Brandt and Christoph Geissmar-Brandt (2007, p. 67) write in their book *Light for cities*, lamps form the heart of a lighting concept and their technical properties have a marked impact in the light ambience; they emanate gleam or soft light, cold or warm, firmly delimiting or diffusely flowing light according to different light temperatures. Since lighting systems are attractive only as long as they work, the economic life of lamps plays a significant role. The authors explain how the longer the life, the greater the chance of lamps being replaced at the right time, and the less labour-intensive and costly are maintenance operations.

The efficiency and the quality of the light emitted by a lamp are usually in contradiction; the better the light quality is (essentially the colour rendition and the colour temperature), the lower luminous efficiency provided. One of the goals of good lighting is to find the right balance between above mentioned opposites. In the same manner also shape and size of lamps are notable.

Lighting equipment, which can be interpreted as its own category, consists of a variety types of luminaires, projectors, fibre optic systems, LED equipment and projectors. In such manner the term urban lighting equipment describes more precisely the ensemble of furnishings used to provide light

which are installed on the site: street luminaires for roadways, street luminaires for pedestrians, wall luminaires to be interweaved to facades, etc.

An important structure by day can become a major landmark by night. Major structures such as bridges can also benefit enormously from precisely designed attractive lighting. The complexity of the assembly or the elegance of the shape can be particularly emphasized when lit up during the night time.

Sculpture has not been so common in the public landscape, but this is changing with the introduction of several works being created in some city centres. Colour can be vivid, surface textures can be emphasized, but the most significant is to lay stress on the dynamic movement captured in a static object, which can be revealed to clearly show the sculptors intention in the design.

New dimensions are added to the scene when lighting is interlaced with water features. Unique requirements need to be taken into account when designing underwater lighting, especially in regard to safety and maintenance.

The institution of lighting engineers also emphasizes how lighting of natural subjects is increasingly becoming popular. They suggest lit trees which may give an impression of a dramatic scenario in the environment. On the other hand lighting may also help to soften the harshness of a winter landscape during the night.

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Economical efficiency

Narboni (2005, p. 33) in his book describes the economical aspect of lamps and promotes lamps as technically more advanced concerning the reduction of electrical consumption. The author compares fluorescent compact lamps (those of 15 watts), which are capable of emitting more luminous flux (900 lumens) for four times less electric power in comparison with a classic incandescent lamp of 60 watts (720 lumens). He points out a fact that low-consumption lamps are sold at a considerably higher price than incandescent lamps but at the same time their average life duration has been considerably improved (9000 hours compared to 1000 hours for incandescent lamps). It is good to know however, that their relatively poor luminous effect causes lack of transparency, visible filament. Therefore brilliance as well as weak ambience created are nevertheless little appreciated by the greater public.

Another way to achieve sustainable lighting is to refine lighting systems using other sources of energy than electricity. In correlation with a new generation of lighting equipment, renewable energy sources - solar, wind, biofuel-, and systems for transforming this energy, storage capacity must be developed further on. There is another possible way to use sun for lighting with solar collector panels, mostly in regions with strong sunlight. Solar supply is an

interesting alternative for the creation of nocturnal landscape but it still needs to be developed. However, this type of installation with solar energy necessitates no more than a few hours of illumination after nightfall. In this way it is conceivable to allow the installation to be activated for a given duration in relation to the amounts of sunshine received during the day.

Light pollution

The intension of artificial light invention is to protect and enrich our night-time environment but on the other hand if lighting is not properly controlled, obtrusive light can cause serious physiological and ecological problems. It is not just a nuisance, but light pollution also means wasting electricity and in this sense thereby large sums of money. It is more important to mention the destroying of the Earth's finite energy resources, resulting in the unnecessary emissions of greenhouse gases.

Lighting is due to high visibility and the significance of making night activity even possible, in the focus of complaints. Lighting designers should employ luminaires in a lucrative way and direct them to the required area, thus minimising also energy consumption and use. Factors which support categories in Environmental zone classification are referring to the lit area which is surrounded by

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residential development and for this reason has a greater potential for complaints. Further on the topography of the area surrounding the lighting installation can also be important. Areas that are at a lower level than that of the lighting installation should be particularly considered, where a direct view of the luminaires is possible. Engineers also describe how physical features such as adjacent tall buildings, trees and spectator stands can help in restricting light spill beyond the boundaries of the development. They stress: it is significant to take into account the presence or absence of the other lighting in the immediate area and the type of lighting involved; arterial road lighting or lighting from adjacent commercial developments are examples where the effect of the proposed lighting is lessened because the surrounding area is reasonably well lit.(The Institution of Lighting Engineers, 2005, page 17)

New lighting systems and strategies to avoid light pollution benefit due to many innovations, mainly in lamp technology. Increased knowledge of the influence of light on the surrounding or environment contributes to better understand the proper purpose of outdoor lighting. In that sense an important objective to avoid light pollution has appeared.

The International Dark-Sky Association (IDA) which was founded in 1988, promote the protection of

the night sky and fight against light pollution since in many regions in the world, bright light fog impedes on the view of the night sky. In that way contemporary light is directional and cut off towards the top, preventing the loss of light and of power. Further on also high-quality light tends to be glare-reduced.

The aim is to find the optimal balance between the desired light effect upon surfaces, elevations or objects on the one hand, and acceptable, albeit minimal glare from as few directions as possible on the other hand. To appreciate that better light is not a question of ideas or temporary installations, but one of independent designs combined with the skilled application of technical innovations, we need to recognise that less light is often better than more.

Several effects appear when talking about lighting parameters. Lighting engineers write that the most effective action to mitigate sky glow, is to control the amount of direct light emanating from close to and above the horizontal that is, by limiting the upward light output ratio of the luminaries. But this will, unfortunately, be relevant if the luminaire is mounted horizontally in a fixed position, as in road lighting.

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Aesthetics and visual intrusion;
common mistakes in outdoor lighting

Since outdoor lighting can be visually intrusive both by day and by night, where possible, lighting columns should be kept in proportion with the surrounding buildings and should not project above them. Visual effects of the lighting sources can be also reduced by rational choice of material and colour, the best is to use neutral colours such as grey.

Randall Whitehead in his book The art of outdoor lighting (199, p. 158) points out how to avoid landscape lighting pitfalls. If an outdoor environment is already illuminated, changing the type of bulb may have a weak effect on the original design. Coloured light may be problematic because it can create the opposite effect to emphasizing a flattering and realistic look. Also underwater lighting may highlight algae and makes the water look muddy. It is also important to take care of debris and dead insects not to have an influence upon desired effect of lighting. The author, in his book emphasizes how choosing fixtures that are over or under scale can cause visual proportion problems; so to say, huge luminaires on small outbuildings and neat fixtures on big buildings look ridiculous. Security light usage may lead to intensively provide light to overpower the surrounding. Just like pagoda lights are not applicable for outdoor luminaires since their glare

makes it difficult to see anything else in such a manner also too powerful bulbs result in harsh brightness that makes it difficult to navigate.

To give weak outdoor lighting a wide berth, it is necessary to think about lighting during the initial phase. Whitehead points out how integrating lighting with overall garden design not only makes the lighting look intentional rather than like an afterthought but also saves energy and money.

Outdoor lighting in every manner needs to be related to usability of different public areas referring to movement along the area, activities at the area; it means that outdoor rooms need to be treated in the same way as interior rooms.

Maintenance

Randall Whitehead (1999, p. 160) reaches some aspects on lighting maintenance which can keep lighting as vibrant and effective as at the beginning. First of all bulbs need to be replaced with the equivalent ones which match the old wattage and beam spread, when they burn out. Ground-mounted luminaires and well lights need to be cleaned frequently to keep them free of dirt and leaves while plants should not be grown over low-level lights.

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The role of time

Roger Narboni (2001, p. 111) in his book writes about the role of the time concerning outdoor lighting. Natural light designates the alternation of time, considering variation of day and seasons as well. Vegetation has an extremely varied life span; some plants are transformed during the day while others after a long period of time. There are several elements which change the landscape on another scale; weather conditions, animals and humans.

To explain the a continuity of natural light, from day to night, the author describes the way the sun increases from dawn and attains its maximum intensity when it is at zenith. Later on the level of luminance is reduced at dusk, and at the latest is slowly replaced by darkness.

Outdoor design lighting may not break the continuity of the 12 hour cycle. As he explains, artificial light must respect the level of luminosity in a manner visually appropriate to different transitions during the day. Preserving periods of total darkness is a significant section of artificial lighting while animating the nocturnal landscape. When doing a lighting design, the area needs to be well analyzed and different luminous scenes need to be taken into account.

While talking about seasonal change of light, it is necessary to mention changes of colours in

outdoor environment as well as changing duration of the day.

Simply changing of the lamps and addition of colour filters of projectors may contribute to the diverse tonalities of lamps and luminosity according to the seasonal variations of the site.

_On-going discussion

_Historical background

_Urban lighting

_Functional aspect

_Vision versus practicality

_Festival lighting

_Human perception of lighting

_Safety

_Lighting equipment

_Economical efficiency

_Light pollution

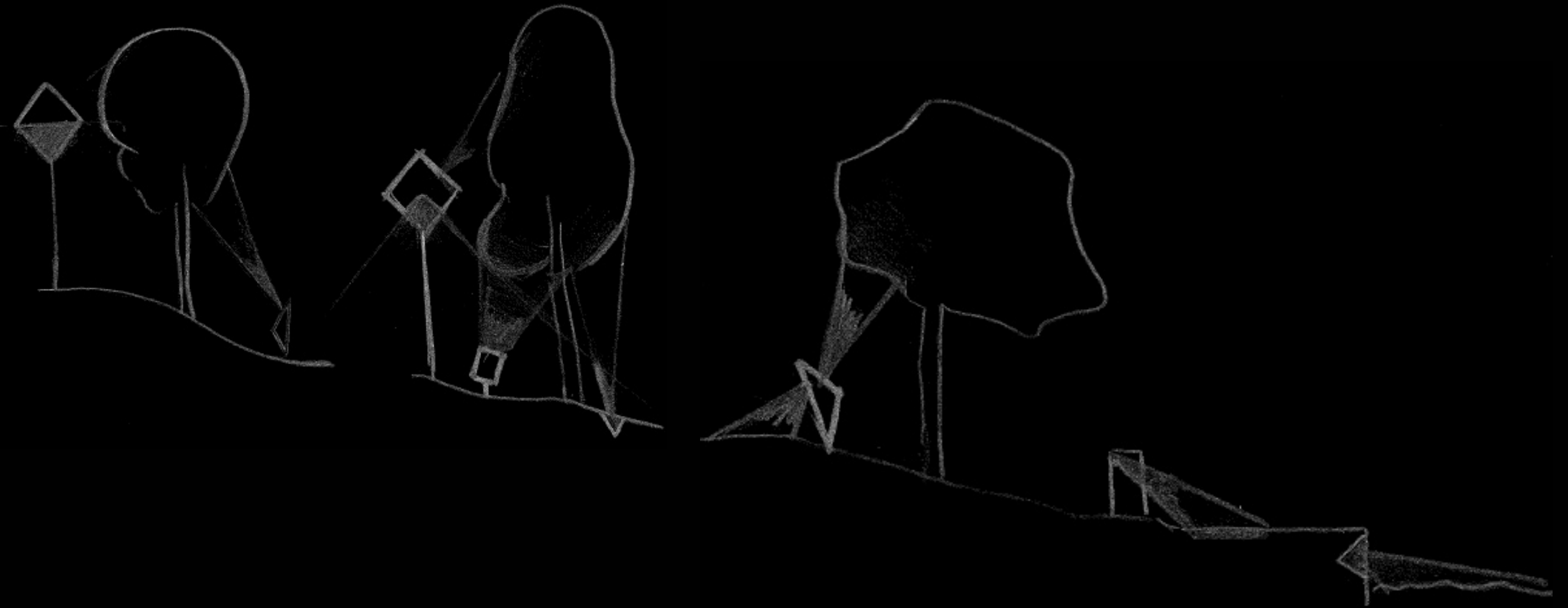
_Aesthetics and visual intrusion

_Maintenance

_The role of time

EXAMPLES

_the visual impact of exterior lighting understood through photos, sketches and diagrams



1.1. Sketch of different kind of lighting

EXAMPLES

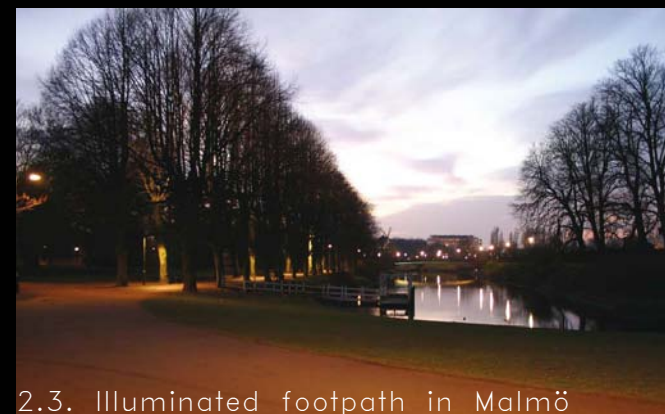
Anders Westin in his Master thesis came out with this kind of technique tracing illumination. Pictographs helped me to understand better the phenomenon of lighting in urban environment. Through black and white diagrams one can recognize how much lighting occurs around the city.



2.1. Lighthouse in Malmö



2.2. Illuminated bridge in Malmö



2.3. Illuminated footpath in Malmö



3.1. Sketch



3.2. Sketch



3.3. Sketch

EXAMPLES

—illumination

channel

square

footpath

street

monument

maritime area

4.1. Illumination of water channel in Ljubljana

EXAMPLES

—illumination

channel

square

footpath

street

monument

maritime area



4.2. Illumination of small square in Stockholm

EXAMPLES

—illumination

channel

square

footpath

street

monument

maritime area

4.3. Illumination of footpath in Ljubljana

—illumination

channel

square

footpath

street

monument

maritime area



4.4. Illumination of street and monument in Warsaw

EXAMPLES

—illumination

channel

square

footpath

street

monument

maritime area

A new project called ‘City lights’ is part of Malmö’s urban programs, which tend to improve the city center in a more inviting way, to make people stay in the city. Great stress lies upon central parts of Malmö, including squares, pedestrian streets and channel rooms. The new programme works as a base for change and upgrade of existing lighting, as well as directions for new lighting design within the city. The programme also includes aspect of security and accessibility of exterior lighting, while safety should not be neglected. The purpose of this document is to work fluently and it can be revised. The aim of this document is to emphasize the importance of changes in lighting within the city. The paper presents a plan of how streets of Malmö and other spots should be lighted; with which light sources, which fixtures, as well as colour or temperature of lighting.

Malmö is working with an Urban Environment Program since the mid-1990s. It is about materiality and variety of equipment, such as colouring and lighting which may be used to design the city environment. The document points out 4 significant aspects on city lighting:

_orientation; the aim is to use lighting to emphasize main directions within the city; in that sense commercial main streets have such a different light than the side streets

_need of light. The idea is that the light should be provided where it counts and works within

a defined time, in intervals.

_aesthetic; it is important to place stress on magnificent spots in the city; to light up the bridges, artwork, building facades, parks. On the other hand night should be preserved as well. Balance between dark and bright needs to be reached.

Malmö has vision to become one of Europe’s first cities well known for its lighting concerning locations which are lit up and choice of equipment for exterior lighting.

The Lighting plan for Malmö provides technical information about lighting equipment and its efficiency. As mentioned in the plan, Malmö highways department intends to replace all mercury light bulbs and switch to more environmentally friendly alternatives. Along the main streets, Western Harbour and the King’s Park, essentially metallhallogen are used to get as good a colour as possible.

An important aspect of lighting is the light source’s ability to reproduce colours (given here in Ra values).

Daylight has a Ra value of 100, which means that the light reflects all colours optimally. The agreement applies to Malmö vehicular, pedestrian and cycle paths are to colour rendering should be about 65 Ra.

Lighting plan for Malmö; description and reflection

In some areas, the colour reproduction rate is higher with a quest up to about Ra 80th. This applies especially to the central parts of Malmö and the most frequent business district. The light bulbs will have a lifespan of at least 12 000 h.

Areas / streets / locations which need to have a high reproduction rate; inside channel, pedestrian area, streets with a lot of foot traffic, town Square, the city's playgrounds, King's Castle, Pil-dammsparken, West Harbour and Hyllie. It is important that the colours are expressed as naturally as possible in places where many people move.

To create a hierarchical image of the city lighting, a precise design needs to be formed. A lower set point of light creates a more intimate feel and the highly placed lights spreads light over a larger area. Low lighting is more appropriate for private areas as for entrance and residential streets but they can also be used to create pleasant atmosphere and give identity to place while large areas are illuminated from higher points, specially referring to traffic safety. High lighting must be properly shielded, that means not to diffuse the light. To reach the goal of eliminating all easily remedied obstacles in terms of lights different aspects need to be taken into account. Newly constructed and renovated lighting shall avoid dazzling and inconvenient establishment of outdoor lighting.

The lighting plan stresses the importance of light while creating a safe city. It is not the amount of light which is important but rather the way the city is illuminated.

Lighting must be set out in a reasonable way, concerning the limitations and including an energy perspective. Thoughtfulness with lighting shall be guided mainly in the large parks and recreation areas but also along the sea front. Important point of exterior lighting is given to facades, trees and statues. In general, Malmö tends to emphasize the difference between urban and rural land when leaving arable fields in dark.

All places and all streets shall not be lighted in the same way. In order to create variety in spirit along the city, and on the other hand clarify the city's structure, lighting design needs to be well considered in every respect.

(summarized after Lighting plan for Malmö)

Malmö municipality. Ljusplan för befintlig belysning. (Published 2008) [online] Available at: <<http://www.malmo.se/download/18.5d8108001222c393c00800082898/Ljusplan.pdf#search=Ljusplan>> [Accessed 24 November 2010].

Lighting plan for Malmö; description and reflection



5.1. Water channel Malmö C station

The Institution of Lighting Engineers stresses the main aims of a strategic urban lighting plan:

- _the provision of a long-term plan for the development of all forms of lighting over 5 - 10 years and beyond time span
- _the visual unification of the disparate night-time components of urban centers, leading to the creation of a coherent night-time identity
- _the accentuation of a town/city's main 'gateways' or entry-points, to create a genuine sense of 'arrival'
- _the after-dark presentation of a city's architectural and heritage assets to best effect
- _the resolution of conflicts between the different lighting needs of various types of users - pedestrian, workers, tourists, drivers and so on
- _the minimization of light pollution, light trespass and visual imbalances in the night-time scene
- _the re-prioritisation of the visual needs of the night-time pedestrian and the creation of a safer, more pedestrian-friendly night-time environment
- _the longer-term goal of stimulating and developing the evening economy, and giving the town/city a competitive edge

(The Institution of Lighting Engineers, 2005, page 27)

Lighting plan for Malmö; description and reflection



5.2. Night view from Ribersborg beach toward Västra Hamnen



5.3. Night view at water channel in the city centre, Malmö



Ribersborg maritime lighting

Fiskhoddarna

water channel in front of Malmö Central station

Background

Seasonal variations modify the quantity and level of water, which cause different characteristic of the river. The channel landscape is horizontally cut through by the bed of the river and vertically limited by masonry wharves in the city. As Narboni writes, a river landscape may be observed directly from the wharf, high points, bridges or overpasses, tall buildings and lookouts. Reflection of the sky in the water surface during the day depends on position of the sun, the angle of vision of the observer, the size of the riverbed, the depth of banks, the clarity of the water, the ground colours and climatic conditions. Further on, during the night, the water surface becomes a virtual mirror capable of reflecting the moon as well as all artificial or surface lighting present on the banks. (Narboni, R. 2004, p. 80)

According to transparency, width of the bed and depth of the water, the bottom of the river may be illuminated with points of light.

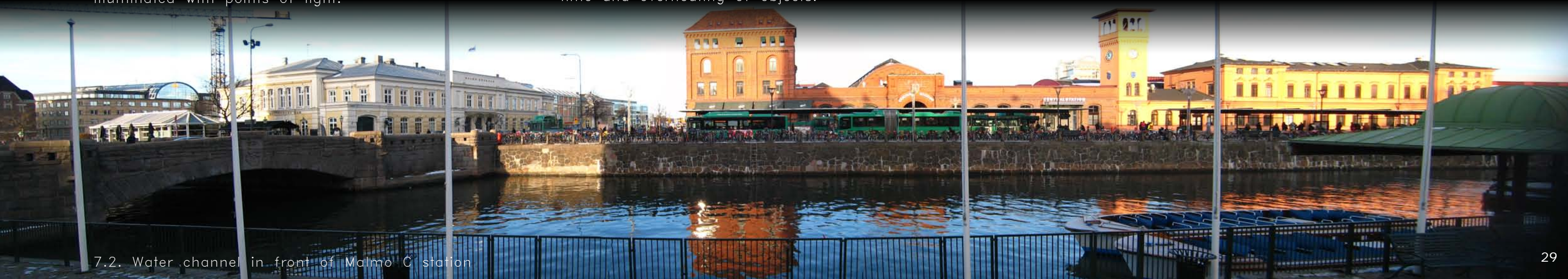
Narboni points out how the mass of water is transformed by light, it becomes luminescent and appears to fill the riverbed. In this case, reflections and the mirroring effects of the surface are partially or totally neglected. Since this type of lighting requires frequent maintenance and cleaning, it is appropriate for rivers with shallow depth, strong current, or where the watercourse is near to a coast, and subject to tidal variation. (Narboni, R. 2004, p. 83)

As with every other outdoor lighting, also this type must not disturb the flora and fauna present at the bottom of the river.

In a similar way as mentioned above, lighting design of the river may include integration of luminous elements in the water where due to disturbance of aquatic flora and fauna, a lighting plan needs to be elaborated carefully, avoiding excessive working time and overheating of objects.



7.1. Map of Malmö city



7.2. Water channel in front of Malmö C station

WATER CHANNEL

In an urban environment, the lighting design for the vertical planes along the watercourse articulates a subtle play of luminous screens, capable of orienting the view and giving rhythm to perspectives. (Narboni, R. 2004, p. 85)

To supply a reason why I chose this spot is, because it is in my point of view one of the significant spots which may be formed as a pre-room of Malmö Central station.

Since this whole area around is frequently crowded for the sake of bus and train stations close at hand. Every time I stop by, I can form a picture of how this place might look more enticing to make a halt there. This channel has a lot of potential. Since the Central station is in a renovation process and will become the largest node in the city where people meet and talk while running after a bus or train.

Lighting for the two bridges, which are nearby was already provided within the Lighting plan 2005, but now-a-days both bridges look forgotten since they are not lit up anymore. Looking from Mälars Bridge toward Petri bridge, on the right side is a concrete platform with few benches, with a jetty, where boats for the city channel sight-seeing takes place. By the side of a small wooden pier there is kiosk which is mainly closed. Toward the Petri Bridge embankment is more natural with poor vegetation. The fact that traffic behind is audible should not affect the in

tention of this area to become a new companionable spot for inhabitants and visitors of Malmö.

On the other side there is a concrete wall, 3 meters above the water. This is a boundary wall between the water and the platform for buses. Behind is the building of the Central station. The wall like it is can be transformed and become more alive, perhaps as a digital screen.

Water in the channel cannot be illuminated since boats are navigating the river during warm season and illumination can affect the habitat under the water.

The area is big enough to hold some temporary exhibitions or events. During all seasons this spot may be turned into a warm landscape room within the city.



7.3. Water channel in front of Malmo C station



7.4. Water channel in front of Malmo C station

Analyses



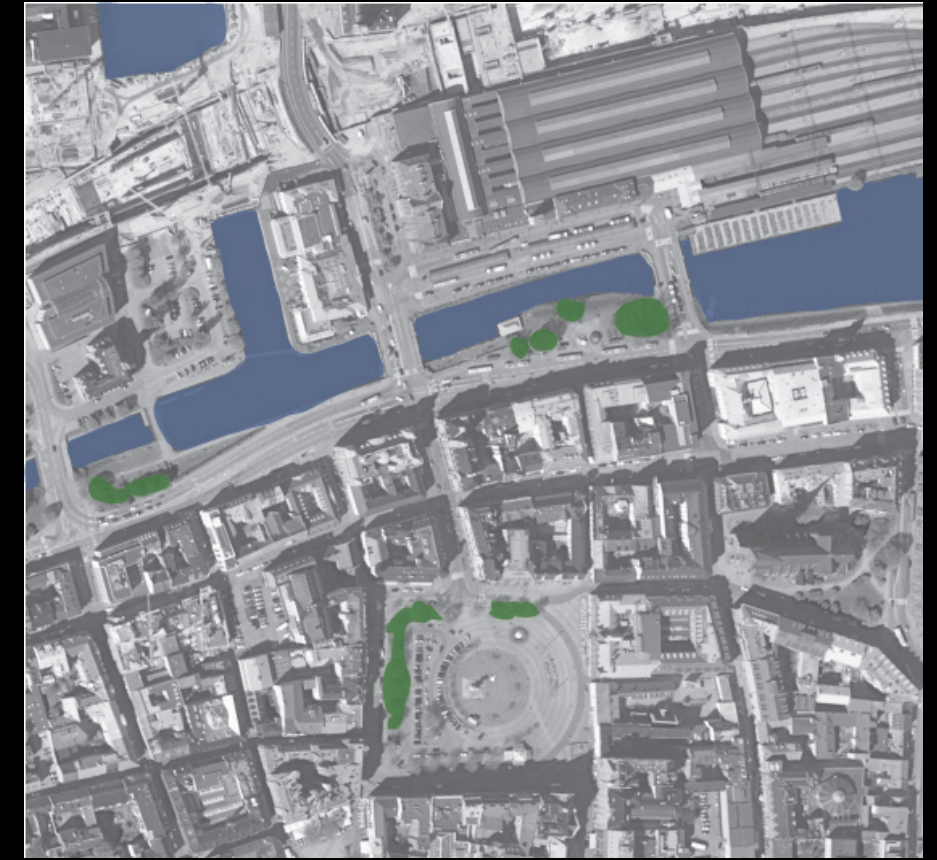
- direction
- view

Image : DIRECTIONS AND VIEWS; transitional area. Views are directed toward the water channel when coming to the Central station.



- structures
- nodes

Image : STRUCTURES AND NODES; Stortorget and Malmö C station are 2 significant nodes in this area surrounded by high buildings.



- water
- vegetation

Image : WATER AND VEGETATION; area is lacking vegetation. Water is dominant.

Design

First water channels in Malmö were lit up in the mid-1990s when the city started to pay more attention to city lighting. The aim was to illuminate spots and objects which are of special interest for inhabitants and tourists of Malmö city. Programme for channel and bridge lighting was established in 1996. All aspects concerning security, aesthetics and function are well considered in this programme.

However it is significant that the light shows the way and it is performed where needed, but on the other hand let the space live in darkness as well. Illuminated bridges and water channels emphasize the ease of orientation and promote safe experiences. The greater part of water channels and bridges in Malmö is well provided with lights. While walking around the city, I found out that for me one of the most important channels is the one in front of Malmö central station, which is veiled in dark.

When one steps out of the Central station building or waits for the next bus, there is nothing to rest their eyes on.

When coming from the city centre, one can recognize the Central station building, while the water is out of view. The two bridges are scarcely visible at night and the water seems black. Walking around the city and observing channels and bridges which gleam in the night and give positive vibrations to people, made me think about lighting this channel in another way as well.

When thinking about the lighting design for the water channel in front of Central station, I tried to find a connection with the station itself. The moment when I entered the underground of the central station for the first time was decisive.



7.5. Proposal for lighting of water channel

WATER CHANNEL

I saw a projection of moving images which lead people to stop for a second, to be lost for a moment while waiting for another train and getting back to the rush of everyday life. Tania Ruiz Gutiérrez, a French, Colombian and Chilean artist, living in Paris and working independently in video and in the visual arts, was extensively travelling around since 2006 to collect material for the artwork Elsewhere, applied in Malmö C underground. Due to her artwork, the underground's closed and concrete landscape is re-formed into an open space.

To draw a parallel to this amazing artwork, I was wondering how images would look like moving on the wall of the water channel in front of Malmö Central station. In comparison with her work illumination of the wall is simplified and shows only images from Malmö city and its surrounding areas. Projectors are placed on the other side of the channel where the station for sight-seeing boats is. The terrain there is transformed into terraced pavement, also lit up with white colour lights. This spot is designed for people who want to sit and calm down, while observing moving images on the other side of the channel. Images are disappearing from the wall in the beginning and ending of the channel in floating and glowing formations which are passing out of sight while sinking under the bridges. The bridges are illuminated in the same way on both sides; white neon lamps placed at the arch directed toward the water are imitating fog and creating a

sense of mystery. Trees in the back, that are dividing the channel space from the street, are also illuminated with white lights. Reflectors are placed at the bottoms of the trunks (with 2 meters distance from them) and have moveable heads. In that way the trees may be visible in several different contrasts between light and shadow.

The lighting design for this spot is simple and recognizable. Illumination of building facades in the background together with the street lights promote this place as an important node in the city, even if they are not spectacular. To emphasize its importance I tried to combine festive lighting with practical one which is needed for security and orientation. New lighting does not strike the eye since none of the light is directed toward the observers eye. Lighting transforms this place into an inviting public space for any passersby to stop here for a while, and it feels alive also during the night.



7.7. Malmö C station. Underground.



7.6. Proposal for lighting of water channel

Background

Back in history, in the early Middle Ages Skåne was one of the most important areas when talking about fishing. For that reason villages or almost small cities were growing along the Skåne's coastline. Herring fishery at that time nearly became an industry.

After the 1658's herring fishery had decreased. Occupational categories of fisherman from that time have appeared in tax records as well as legal protocols.

After 1658, Malmö, as a stagnant city under the Swedish rule, has felt an increase in population.

The few fishermen, who were still active at this time, donated his hodder to Malmö Museum with the caveat that they could use the sheds during their lifetime.

In 1956 the remains of the Fiskehoddorna moved to Baner quay next to the Maritime Museum. There is also one of the last herring boats which now belong to the Museum, on show.

Fiskehoddorna is today a unique and still living element in the streetscape.

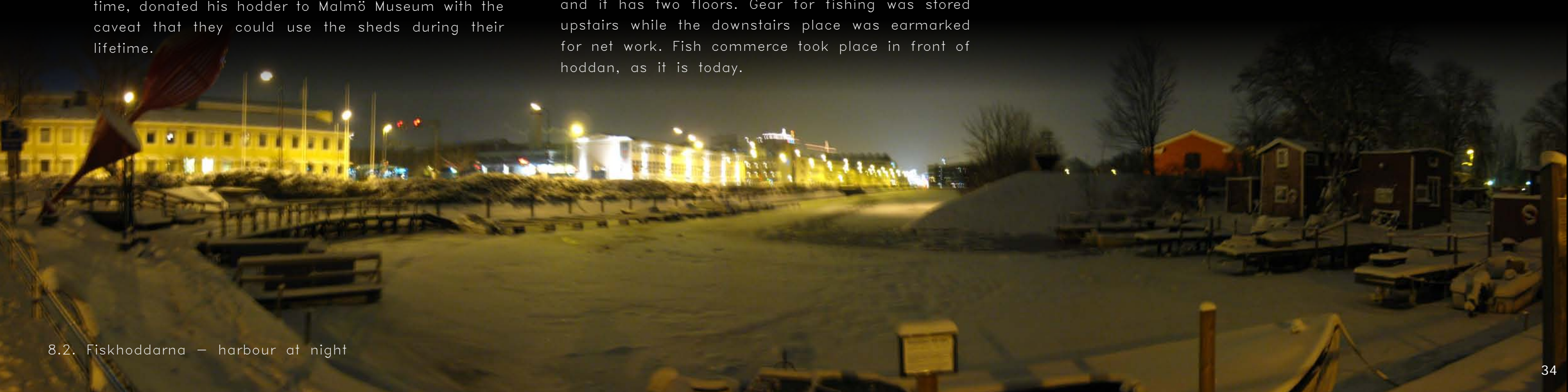
(2009-01-07/ Bo Gentili, City Library)

That is why a number of fishermen in Malmö arose again.

The construction of Fiskehoddarna began during the second half of the 1800s. Initially hoddan was a simple one room building which was later on transformed to a two-room flat, high and narrow and it has two floors. Gear for fishing was stored upstairs while the downstairs place was earmarked for net work. Fish commerce took place in front of hoddan, as it is today.



8.1. Map of Malmö city



8.2. Fiskehoddarna – harbour at night

FISKHODDARNA

In the second half of 1900s, hoddan was threatened with closure since the importance of fisheries was sinking and the trade was taken over by merchants. The few fishermen, who were still active at this time, donated his hodder to Malmö Museum with the caveat that they could use the sheds during their lifetime.

In 1956 the remains of the Fiskehoddorna moved to Baner quay next to the Maritime Museum. There is also one of the last herring boats which now belong to the Museum, on show.

Fiskehoddorna is today a unique and still living element in the streetscape.

(2009-01-07/ Bo Gentili, City Library)

As it is mentioned above, due to its significant role in history and dissimilarity to other places in Malmö, this small undersized street full of warmth, should be turned into an illustrious spot where people will zealously go.

Surrounded with water, greenery and built structures, the street holds a peculiarity but on the other hand is far enough from the city center to sink in oblivion. Traffic is almost out of sight. When you enter the street from Malmöhusvägen your eyes dwell on Turning Torso in the distance. The street is from the other side bounded by a park.

The first time I recognized this street incidentally when I was running from the city center through

Kungsparken to Ribersborg. I stopped there and keep watching. It was mysterious to me; small red-dish wooden houses looked forsaken, nobody was there. Another day when I passed it, it was already dark. Just one light was illuminating the street. The place lost its originality. That is why I decided to work with this area. I am of the opinion that precise lighting design should contribute and bring to this minute street a new evening spirit.

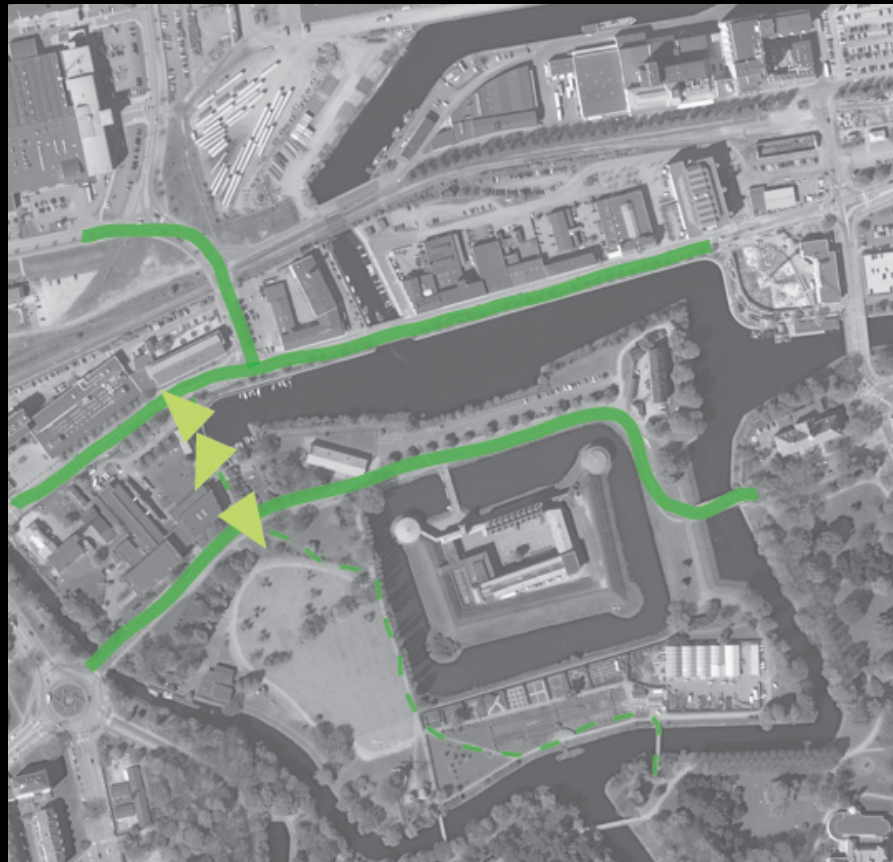


8.3. Fiskhoddarna – wooden houses



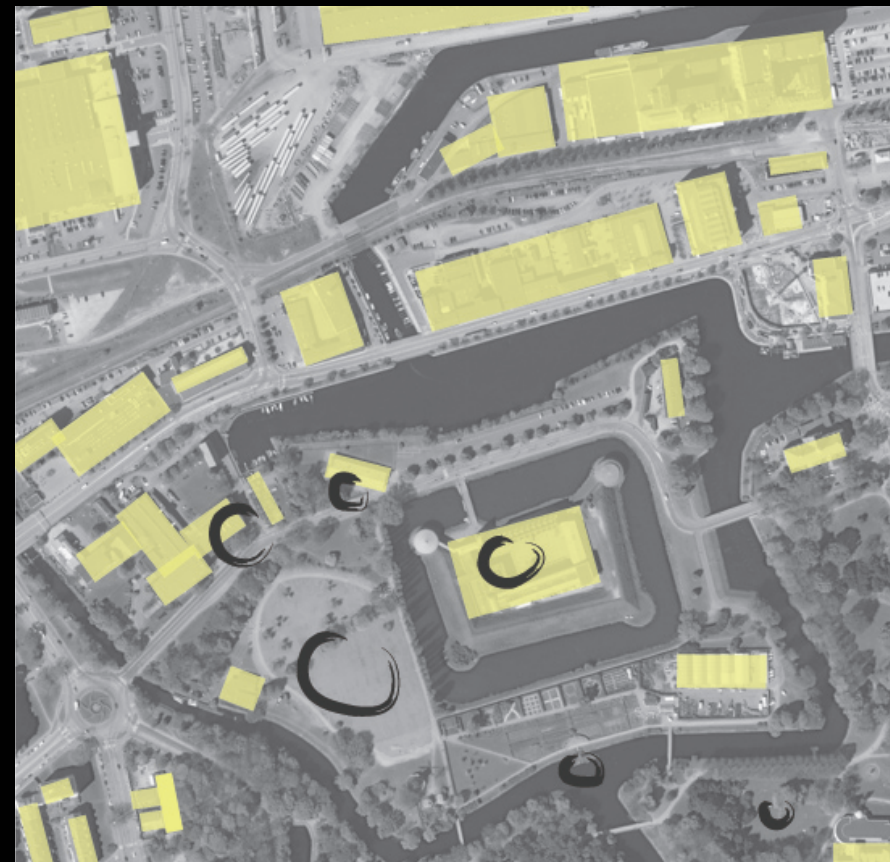
8.4. Fiskhoddarna – the street

Analyses



- direction
- view

Image : DIRECTIONS AND VIEWS; when coming from the city centre one can recognize Turning Torso in distant. On the other site view is open toward greenery.



- structures
- nodes

Image : STRUCTURES AND NODES; this area is surrounded with less build structures as water channel before. Nodes exist but they are not as important as Central station and Stortorget



- water
- vegetation

Image : WATER AND VEGETATION; area is predominantly green and blue.

Design

Fiskhoddarna may not be one of the most attractive spots in Malmö since it is not even well-known among the inhabitants, but it has the potential to become more inviting and recognizable. In this sense something needs to be done. When visiting this place during a sunny day, one can feel pleasantness and calmness. When the fish market is closed people do not idle there, instead the place is used more like a transitional passage. During the night this spot gives an impression of oblivion; a few lights illuminating the street, the small harbour is wrapped in a veil of mystery, and some lights

shining from the windows do not allure a passersby to dwell there in their free time. To change this image it is necessary to think about people who pass through this area and since it is quite far from the residential area it can hold spectacular lighting. First I was analyzing particular elements which take place there. Small wooden houses, the remnant of an old railway track, small scale harbour with wooden piers and a red sculpture were taken into consideration.



Safety aspect is to a certain extent achieved by already existing street lights. However the alley still strives for better orientation including safety aspect as well.

Old railway track is transformed into illuminated lines covered with blue opaque glass. Projection of fish silhouettes swimming along the track emphasizes the sense of this place. Facades of the small wooden houses are lightened with white colour from the top of the roof towards the bottom of the house. Illuminated facades make this alley more calm and charming. The harbour nearby is illuminated in the same way. White floating lights placed under the wooden deck show this site in a new style;

The high red sculpture is hidden during the night while it shines in all its beauty during the day. To change that view at night I decided to lighten it with white lights placed inside the highest part of the sculpture from both sides. The lower part is illuminated from a reflector which is placed at the bottom of the sculpture.

Surrounding vegetation is lit up with small lights interweaved within branches while the tree trunks are illuminated with reflectors placed in distance.

The new lighting design for Fiskhoddarna fits the area out with suitable spectacular lighting, and the functional aspect is not excluded either. Lights need to be maintained as circumstances require. Design tends to invite people to stop by, to take a rest and get to know this latent spot in Malmö city also by its interesting role in history.



Background

With the intention to do the lighting proposals for different areas in Malmö, regarding function and scale, I chose as a third spot the northern part of Ribersborg beach. It is an open spot which yearns for some illumination. The place is well known as a recreational area and it is also a common spot for dog walkers. People visiting this place contemplate the sea and observe the city from a distance. Traffic is hidden from view and the remoteness from buildings offers people calmness. Due to its openness, this spot is exposed to wind. Shrubbery and trees rarely appear but owing to large surface of grass, the place looks green anyhow.

A path for recreation among the park is lucratively illuminated while the green surface toward the sea is entirely darkish. Little by little light is coming from nearby houses in Västra Hamnen and from the Turning Torso. To observe the silhouette of Copenhagen city and the illuminated Oresund Bridge in clear night, it is relatively important to stay in the dark and not be bothered by lights. But on the other hand, there are several admirable arts which lose their captivation during the night. In a way this spot can be convenient for many other activities for a small number of people than just recreation; art exhibitions, fashion shows, musical performances etc. Furthermore, this spot may become known not just for the longest beach in Malmö but also for its own unique illumination but still keep a primary natural view during the day.



9.1. Ribersborg footpath



9.2. Map of Malmö city



9.3. Ribersborg by night

Analyses



- direction
- view

Image : DIRECTIONS AND VIEWS; area is wide and open. Movement is recognizable all around the area since it is recreational area.



- structures
- nodes

Image : STRUCTURES AND NODES; area is promoted as a significant node out of the city centre. Structures are in far distance.



- water
- vegetation

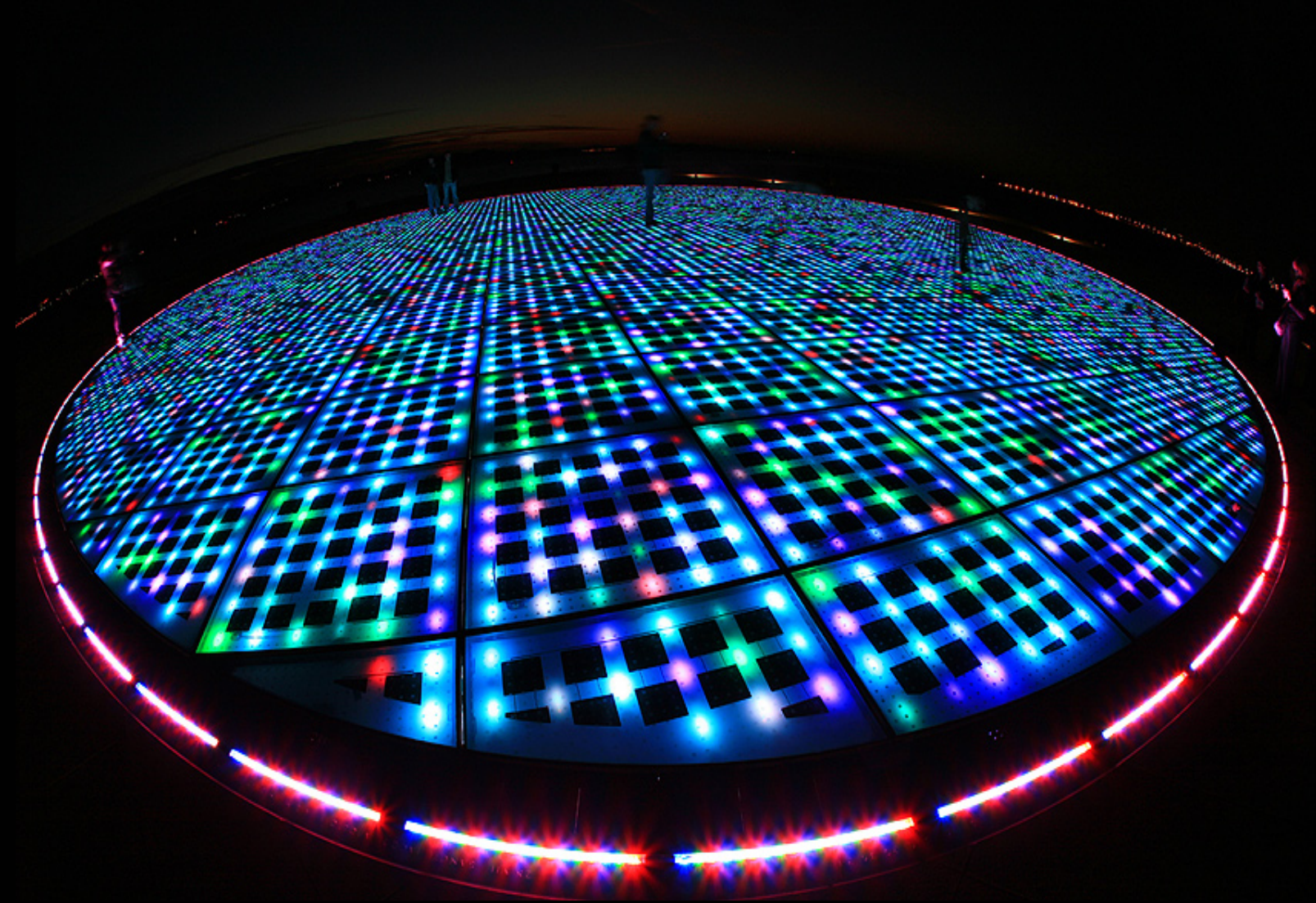
Image : WATER AND VEGETATION; area is predominantly green and blue since it is surrounded by the sea.

Design

Ribersborg promotes itself as one of the most attractive spots in Malmö during the day. When visiting this area at night, spot loses its popularity. Only one small footpath beside the main recreational path is lightened. When ending this path and continue walking towards the coastline, one can observe lights in the distance, illuminated Oresund bridge and the silhouette of Copenhagen on the other side. No one is there after the sun goes down and I believe it is because people do not feel safe there and lose their orientation, since the area is wide and open. Concerning this aspect I decided to keep a balance between light and dark.

When thinking about a lighting design for Ribersborg, an artwork of a Croatian architect Nikola Bašić came to mind; he made a fantastic urban installation on the coastline, at the very end of the Zadar peninsula, next to the famous Sea Organ.

The Greeting to the Sun consists of three hundred multi-layered plates placed at the same level as the stone-paved waterfront and in the shape of a 22-meter-diameter circle. Under the glass conduction plates are photo-voltage solar modules through which symbolic communication with nature is performed, with the aim of communicating with nature just like the Sea Organ, the latter with sound and the former with light. Simultaneously with the „most beautiful sunset in the world“, the lighting elements installed in

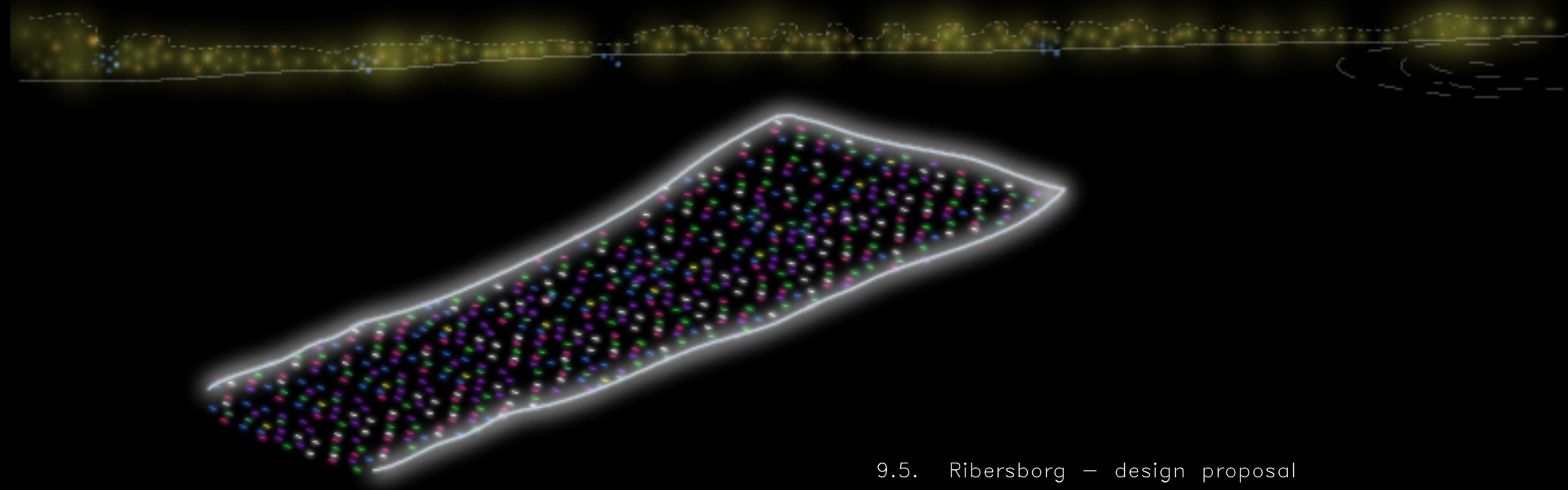


9.4. Zadar – Pozdrav Suncu.

a circle turn on and, following a particularly programmed scenario, they produce a marvellous and exceptionally impressive show of lights in the rhythm of the waves and the sounds of the Sea Organ. The photo-voltage solar modules absorb the energy from the sun and transform it into electrical energy by releasing it into the distributive voltage power network.

This energy will be three times cheaper than the actual one, and the project itself is a unique example of connecting the use of renewed energy sources, energy efficiency and city space arrangement.

This work may be applied to Ribersborg coastline since area is distant enough from surrounding neighbourhoods and it is near by the sea to take advantage of the sea, waves and sun. I changed the shape into shape of Turning Torso shade. Due to the undulating terrain, the first step is to prepare and level the ground. Analyses show that there are several important nodes in the surroundings. Since the Turning Torso is already well visible from the airplane while landing at Copenhagen airport, a new shining circle might be another significant landmark visible from a distance. Malmö city tends to become one of the most sustainable cities in next 20 years. Applying Nikola Bašić's urban artwork may contribute to the identity of Malmö's sustainable development.



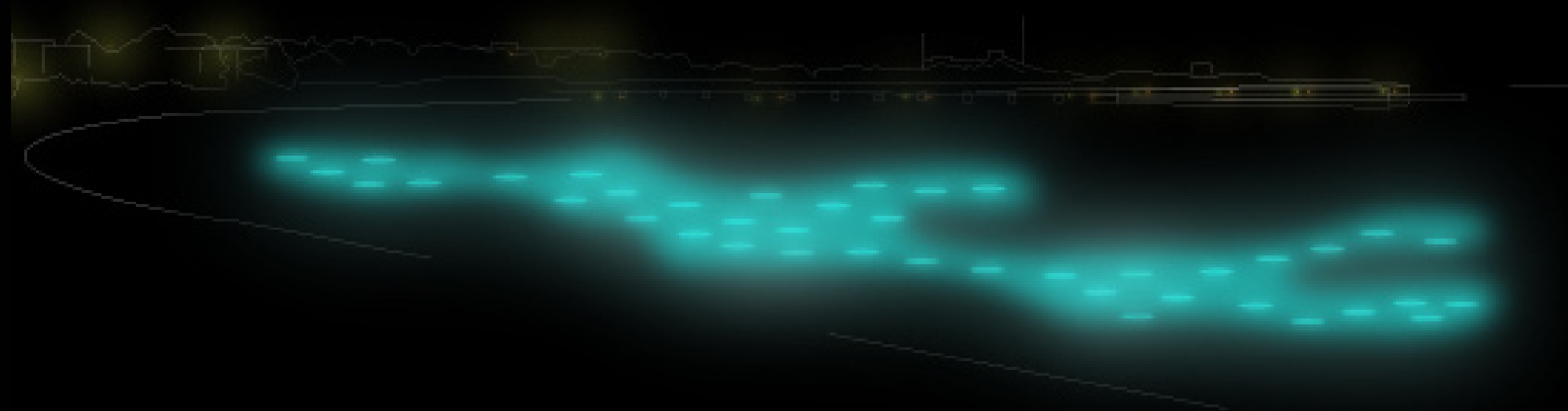
Furthermore, while looking after extraordinary lighting designs, I took insight into one of the Motoko Ishii's light designs applied in 1975 at Okinawa. She illuminated the ocean by installing equipment along the coral reef. Lights were placed at a depth varying from 4 to 10 meters and were extending more than 1 km in length.

This underwater lighting created poetic amoeba-like forms, without any technological connotations. The corral barrier reef was thus magnified by the fluorescence of the light and by its reflection on the marine micro-organisms. In addition to enacting this performance, the installation served as an effective marker for boats and fishermen.

The possible development of this luminous principal has also been tested by cooperative organisation of a fisherman there, who made on-site investigation to find out if the light might act as a lure for fish. After six months of testing, this underwater lighting was determined not to be the source of any harm and continues to function normally. This creation was driven by a concern to preserve the view of the moon and stars, as well as by desire to develop lighting equipment capable of withstanding the violence of the ocean. Narboni page 74

52 pieces of lighting equipment are placed under the water and attached to dead weights. Lights are spaced at about 25 meters apart and provided with 400W metal halide lamps.

A similar lighting design has the potential to be placed at sea along Ribersborg coastline. It may become a new landmark beside the Turning Torso close at hand. This kind of lighting does not promote the area with safety; it is spectacular and draws attention among visitors. Since this area is well known as a summer bathing spot, a light installation may not be acceptable for people but it shows a fresh way of lighting in Malmö. However, Ribersborg is lacking lighting design concerning safety and functional aspects and both suggestions might help to provide this area in a new way also during the night.



9.6. Ribersborg – design proposal

The intention of this very last chapter is to relate my thoughts and design proposals with the studied theory and evaluate my designing results. This project is divided into three parts; theory, investigation of three different spots in Malmö and designing proposals for them. My work started with reading the theory and focusing on texts which may give convenient answers to my objectives about lighting design. After the theoretical part, I focused my attention to search after already existing extraordinary lighting designs and get inspired by them. Next step in my process was a choice of three different spots in Malmö which are lacking lighting. The selection was not easy because no one from Malmö municipality gave me an answer. So I decided to go my own way; walking around Malmö city, trying to find appropriate spots to be investigated more in detail and provide them with new lighting proposals. All spots are chosen deliberately; taking into consideration existing safety and functional aspects as well as importance of orientation. None of these spots hold any spectacular lighting and the atmosphere there is rather dull during the night. People do not hang around because there is nothing to look at or they do not feel safe. Through investigations and analyses of three different areas, exactly the kind of lighting design came out to cover safety and functional aspect, and further on I paid attention to festive lighting which is attractive for people.

Sketching and getting familiar with all different

options of lighting kept my imagination running.

When reading through literature I realized how lighting differs from location to location and depends on what designer wants to achieve with it.

A master lighting plan is an important document of every particular city. To imagine how people would feel lost if all lighting in the city collapsed is inconceivable. When thinking about small scale lighting design, the designer needs to take into account all different aspects. That is why in the very beginning of my process, I drew up some starting points, which need to be covered with my final proposals.

My design proposal for the water channel in front of Malmö Central station is simple and brings out already seen lighting design, which is placed in Malmö C underground city tunnel. The intention of this lighting design is to connect the station's interior with its exterior and by applying moving images on the channel wall one can recognize this relation.

Fiskhoddarna as a remote spot in the city strives after a new refreshing lighting design. White coloured lights are predominant, blue old railway track including moving fishes are just for enlivenment.

Lighting proposals for Ribersborg area differ from the other two. Lighting there is most of all showy and does not provide a spot with functional lighting as the other two proposals. The intention of this spot is to gather people, to be visible from a distance and from a landing plane.

With these lighting proposals I want to achieve popularity among the inhabitants and tourists visiting Malmö in any part of the year.

I strive after simple lighting principles, using already known lighting equipment which is economically efficient. Safety is one of the most significant aspects in lighting, it promotes the feeling of safety among people due to its significant role in outdoor environment; concerning orientation on one hand, but on the other hand lights need to be chosen precisely to avoid inconvenience due to surface temperature as written by The Institution of Lighting Engineers.

By investigating unsuccessful lighting designs and reading the chapter written by Randal Whitehead about common mistakes in outdoor lighting I decided to use the lowest amount of different colours to avoid problems in subsequent maintenance by changing bulbs etc. Despite all that the lighting still needs to be maintained when necessary.

As every single person perceives light in a different way it is important to find common lighting principles which are applicable to particular spots and do not bother people living nearby. Narboni in his book *Lighting the Landscape* writes about position of luminaries; if luminaries are placed higher and far from the observers field of view, glare is disabled. In my design proposal I tend to place lights out of the observers view; higher or lower. All spots are distanced enough from dwellings; none of the

lights are placed toward the facade of a building where people live.

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When designing for a particular spot it is necessary to keep in mind what Roger Narboni pointed out in his book *Lighting the landscape* – that colour in outdoor environment is changing during seasons and also a different duration of the day may influence the lighting design.

I took this aspect into consideration while designing the three different spots in Malmö since days during winters here are very short, but on the other hand summer days are long and bright.

In my point of view, different lighting proposals for the water channel and Fiskhoddarna achieved a balance between functional and spectacular, while the lighting proposal for maritime and Ribersborg beach is most of all spectacular and attractive.

Spectacular lighting holds a special place in this project. That is evident from all of my lighting proposals.

To conclude, I may point out that designing with lights is not nearly as easy as one might think. It needs to be well considered by choosing lighting equipment and it must be placed properly, not thinking only about installation, but about people and their environment. Several mistakes can occur suddenly when any of the important aspects mentioned above are missing out. This project taught me to see landscape design in another way, focused more on public space within the city; most of all thinking about people's perception of a single spot, how they use it, which are the main movement directions, what is beautiful at the spot and needs to be lightened up.

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